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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,533	09/30/2005	**Shen Zhao**	11955/8	4330

757 7590 08/21/2008

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EXAMINER	
KIM, JOHN K	

ART UNIT	PAPER NUMBER
2834	

MAIL DATE	DELIVERY MODE
08/21/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,533	ZHAO, SHEN	
	Examiner	Art Unit	
	JOHN K. KIM	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 June 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/4/2008, 11/13/2006, 4/11/2006, 9/30/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action is in response to papers filed on 26 June 2008. Amendments made to the claims and Applicant's remarks have been entered and considered.

2. Claims 1-10 are pending and are presented for examination. Claim 1, the independent claim, has been amended.

Response to Arguments

3. Objection to drawing is withdrawn as it has been amended or explained. However the amended drawing confirms the invention has serious defect for proper operation.

4. Applicant's arguments to claim rejections under 35 U.S.C. 103 have been fully considered but not persuaded

5. Muller discloses analogy machine configuration as shown in invention. Furthermore, Muller teaches the machine being operable while the machine in invention is not clear if it can be operated. In Figs. 3 and 10, Muller discloses that the distance from the radial outline of the center portion of each of the salient pole to the rotation center of the rotor core is not more than 99% of the distance from the radial outline of the circumferential end portion of the salient pole to the rotation center of the rotor core since the salient pole in lower side clearly shows the arc is deceasing from one end to the other end and the gap will not more than 99%. Muller further teaches the angle between the line connecting one of the circumferential outlines of each of the salient pole and the rotation center of the rotor core and the line connecting the other

circumferential outline of the same salient pole and the rotation center of the rotor core is not less than 100 degrees as being measured to be 165 degree.

6. Regards claim 3, the rejection is based on Yamashita et al (US 6708388), where the facing surfaces of the rotor core (31) and the permanent magnet (1) formed in the shapes of the circular arc surfaces of which center positions are different from each other. It is to follow the claim language. However, what disclosed in invention is such that magnet arcs have two different arc centers as shown in Fig. 3B. It is the same concept as the magnet design shown in Fig. 3 of Blaettner et al (US 5497039), and it is well known permanent magnet design method in industry. Meanwhile, the said rotor (3) shown in Fig. 3A has also two arc centers for R3 and R4, and this method is often used for reduction of cogging problem. Thus, there are four arc centers in the disclosure. The relationship of these four centers is not clearly described in the disclosure. Therefore, if claim is to define such relationship, disclosure in specification and drawing need to be cleared.

7. Regards claim 7, as mentioned in claim rejection 35 USC 112 below, the examiner sees the disclosure has defects. Unless otherwise additionally described in the invention, the core with salient pole and coil can not be a rotor in order to operate properly. Therefore, the examiner believes Muller still teaching the claim 7 limitation of rotor core. However, the rejection is fully based on the language in the claim.

8. There had been a couple of typographic errors in the examiner's first office action. The errors are minor and would not be a problem to read the meaning of paragraph. However, the examiner regrets for any inconveniencies.

Response to Amendment

9. The claim 1 has been amended with new limitations. Specification and Drawings are amended too. The examiner reviewed amended claims and remarks as below.

10. Independent claim 1 has been amended by limiting further, and therefore, the examiner's remarks have been changed accordingly as listed below.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites "... wherein an electric current is supplied (via wire 9) to the rotor coils (5), so that a relative angle position of the rotor and the stator is displaced;" and supported by Figs. 1A-B. However, rotor as shown in Fig. 1A is an equilibrium state before current is supplied. It is a well known problem that the rotor of such structure can not rotate because of equally balanced torques. Another minor problem to point out is a wire for electric current supply to the rotor. The wire is directly connected to the

rotor coils. In case that the rotor is continuously rotating, the wire can not be remained to connect with the rotor coil or, due to the wire, the rotor rotation is restricted. Drawing and specification modified upon the request from the examiner do not solve these problems.

On the contrary, cited prior art Muller (US 4099104) shows element (10) with salient pole and coil is a stator while element (42) with permanent magnet poles is rotor as rotating around the stator, which is quite normal to operate. This also can be found many other references such as Doemen (US 4030005) and Muller (US 4374347). In other to avoid such problem in case that the element with salient pole and coil is a rotor, brush and commutator can be employed as shown in Furuya et al (US 6568066).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. Claims 1-2, 5-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blaettner et al (US 5497039) in view of Yamaguchi (US 4881002) and in further view of Muller (US 4099104).

As for claim 1, Blaettner teaches (in Figs. 1-3) a proportional rotary torquer (20) comprising: a stator (comprising 24; col. 10, line 37) having plural permanent magnets (24); and a rotor (26) having a rotor core (28) which plural salient poles (between slots 128) are formed at, and one , or more rotor coils (125) are wound around; wherein an electric current is supplied (via 98) to the rotor coils (125), so that a relative angle position of the rotor and the stator is displaced; wherein the permanent magnet (24) has two circumferential end portions (102, 104 in Fig. 3B) and one circumferential center portion (100 in Fig. 3B), and the radial thickness of the circumferential end portion is from 90% to 95% of the radial thickness of the circumferential center portion; (in case of Fig. 3B design). Blaettner, however, failed to teach or suggest wherein the distance from the radial outline of the center portion of each of the salient pole to the rotation center of the rotor core is not more than 99% of the distance from the radial outline of the circumferential end portion of the salient pole to the rotation center of the rotor core; and wherein the angle between the line connecting one of the circumferential outlines of each of the salient pole and the rotation center of the rotor core and the line connecting the other circumferential outline of the same salient pole and the rotation center of the rotor core is not less than 100 degrees.

In the same field of endeavor, Yamaguchi teaches (in Figs. 1-4) the distance from the radial outline of the center portion of each of the salient pole (5-22) to the rotation center (center of 6) of core (5) is not more than 99% of the distance from the radial outline of the circumferential end portion of each of the salient pole (5-21) to the rotation center (center of 6) of the core (5). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Yamaguchi with that of Blaettner for reduction of noise by modifying flux distribution. Yamaguchi however failed to teach the angle between the line connecting one of the circumferential outlines of each of the salient pole and the rotation center of the rotor core and the line connecting the other circumferential outline of the same salient pole and the rotation center of the rotor core is not less than 100 degrees. In the same field of endeavor, Muller teaches (in Fig. 10) the angle between the line connecting one of the circumferential outlines (50) of the salient pole (52) and the rotation center (center of 39) of the core (10) and the line connecting the other circumferential outline (51') of the same salient pole (52) and the rotation center (center of 39) of the core (10) is not less than 100 degrees. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Muller with that of Blaettner and Yamaguchi for simpler machine structure by constructing two pole machine.

As for claim 2, Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. Blaettner further teaches (in Figs. 1-3) the proportional rotary

torquer is structured such that: the radial thickness of the permanent magnet (see 24 on Fig. 3B) at the circumferential end portions (102, 104) being smaller than the radial thickness of the permanent magnet at the circumferential center portion (100). Meanwhile, Yamaguchi further teaches (in Figs. 1-4) the distance from the radial outline of the center portion (5-22) of the salient pole (5) to the rotation center (center of 6) of the rotor core (5) being smaller than the distance from the radial outline of the circumferential end portions (5-21) of the salient pole (5) to the rotation center of the rotor core. Meanwhile, Muller further teaches (in Fig. 10) the angle between the line connecting one of circumferential outlines (50) of the salient pole (52) and the rotation center (center of 39) of the rotor core and the line connecting the other circumferential outline (51') of the same salient pole (52) and the rotation center (center of 39) of the rotor core being an obtuse angle as being measured to be 165 degree.

As for claim 5, Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. Blaettner further teaches (in Figs. 1-3) the permanent magnet (24) has a facing surface facing the rotor core (28), the facing surface at the circumferential end portion (102, 104) formed in the shape of a flat-cut surface.

As for claim 6, Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. Muller further teaches (in Fig. 10) the rotor core (10) has two facing surfaces (52, 53) respectively facing the two-permanent magnet (143), each of the facing surfaces of the rotor core (10) formed in the shapes of a plurality of circular

arc surfaces (at 50, 50', 51, 51' and center of 52) of which center positions are different from each other, except the two permanent magnets as it is a ring magnet with two magnetic poles. Blaettner, however, teaches (in Fig. 1) two permanent magnets (24). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Blaettner with that of Muller for manufacturing easiness of the magnet by using segment magnets.

As for claim 7, Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. Muller teaches (in Fig. 10) the core (10) has two facing surfaces (52, 53) respectively facing the two permanent magnets (143), each of the facing surfaces formed in the shape of an elliptical surface. Muller failed to teach the core is rotor core, but Blaettner teaches (in Fig. 1) core (28) is a rotor core. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Blaettner with that of Muller for DC operative machine.

As for claim 9, Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. Muller further teaches (Fig. 10) the permanent magnet has two circumferential end portions (176, 177), each of which has a non-magnetized region formed thereat. (col. 7, line 38)

15. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blaettner et al (US 5497039) in view of Yamaguchi (US 4881002) and Muller (US 4099104) as modified in claim1 above, and in further view of Yamashita et al (US 6708388).

As for claim 3, Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. Blaettner further teaches (in Figs. 1-2) the rotor core (28) and the permanent magnet (24) have facing surfaces facing each other. The references, however, failed to teach the facing surfaces of the rotor core and the permanent magnet (1) formed in the shapes of the circular arc surfaces of which center positions are different from each other. In the same field of endeavor, Yamashita teaches (in Figs. 1A, 5A-B) the facing surfaces of the rotor core (31) and the permanent magnet (1) formed in the shapes of the circular arc surfaces of which center positions are different from each other. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Yamashita with those of Blaettner, Yamaguchi and Muller for reduction of cogging torque.

As for claim 4, Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. References however failed to teach the permanent magnet has a facing surface facing the rotor core, the facing surface formed in the shape of an elliptical surface. In the same field of endeavor, Yamashita teaches (in Figs. 5A-C) the permanent magnet (1) has a facing surface facing the rotor core (3), the facing surface formed in the shape of an elliptical surface. Therefore, it would have been obvious to a

person of ordinary skill in the art at the time the invention was made to combine the teaching of Yamashita with those of Blaettner, Yamaguchi and Muller for reduction of cogging torque by providing different airgap distance along the pole face arc.

16. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blaettner et al (US 5497039) in view of Yamaguchi (US 4881002) and Muller (US 4099104) as modified in claim1 above, and in further view of Nitta et al (IDS, JP 09-163708, English machine translated).

Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. Muller teaches the rotor core (10) has two facing surfaces respectively facing the two-permanent magnet (143). However, Muller failed to teach the two permanent magnets, but Blaettner teaches two permanent magnets. The references, however, failed to teach the rotor core has the facing surface at the circumferential end portion of the salient pole formed in the shape of a flat-cut surface. In the same field of endeavor, Nitta teaches (in Fig. 1) the core (12) has the facing surface at the circumferential end portion of the salient pole (12a) formed in the shape of a flat-cut surface. (at both edges of 12a) Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Nita with that of Blaettner and Muller for easiness of core stamping by avoiding acute angle.

17. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blaettner et al (US 5497039) in view of Yamaguchi (US 4881002) and Muller (US 4099104) as modified in claim1 above, and in further view of Guttinger (US 4296341).

Blaettner, Yamaguchi and Muller teach the claimed invention as applied to claim 1 above. However, the reference failed to teach the proportional rotary torquer further comprises one or more elastic members generating the torque at the magnitude proportional to the angular displacement of the rotor and in the direction opposite to the rotation direction of the rotor. In the same field of endeavor, Guttinger teaches (in Fig. 1) the proportional rotary torquer further comprises one or more elastic members (18) generating the torque at the magnitude proportional to the angular displacement of the rotor and in the direction opposite to the rotation direction of the rotor. (col. 3, line 30-39) Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Guttinger with that of Blaettner and Muller for damping of the rotor motion.

18. Claim 1 is alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Blaettner et al (US 5497039) in view of Furuya et al (US 6568066).

As for claim 1, Blaettner teaches (in Figs. 1-3) a proportional rotary torquer (20) comprising: a stator (comprising 24; col. 10, line 37) having plural permanent magnets (24); and a rotor (26) having a rotor core (28) which plural salient poles (between slots 128) are formed at, and one , or more rotor coils (125) are wound around; wherein an electric current is supplied (via 98) to the rotor coils (125), so that a

relative angle position of the rotor and the stator is displaced; wherein the permanent magnet (24) has two circumferential end portions (102, 104 in Fig. 3B) and one circumferential center portion (100 in Fig. 3B), and the radial thickness of the circumferential end portion is from 90% to 95% of the radial thickness of the circumferential center portion; (in case of Fig. 3B design). Blaettner, however, failed to teach or suggest wherein the distance from the radial outline of the center portion of each of the salient pole to the rotation center of the rotor core is not more than 99% of the distance from the radial outline of the circumferential end portion of the salient pole to the rotation center of the rotor core; and wherein the angle between the line connecting one of the circumferential outlines of each of the salient pole and the rotation center of the rotor core and the line connecting the other circumferential outline of the same salient pole and the rotation center of the rotor core is not less than 100 degrees. In the same field of endeavor, Furuya teaches (in Figs. 7-8) the distance from the radial outline of the center portion of each of the salient pole (above 13) to the rotation center (center of 7) of core (8) is not more than 99% of the distance from the radial outline of the circumferential end portion of each of the salient pole (12) to the rotation center (center of 7) of the core (8); and wherein the angle between the line connecting one of the circumferential outlines (one of 12 in Fig. 7) of each of the salient pole and the rotation center(center of 7) of the rotor core (8) and the line connecting the other circumferential outline (opposite 12 in Fig. 7) of the same salient pole and the rotation center of the rotor core is not less than 100 degrees. (as the angle is measured being 107 degree) Therefore, it would have been obvious to a person of ordinary skill in the

art at the time the invention was made to combine the teaching of Furuya with that of Blaettner for reduction of cogging.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN K. KIM whose telephone number is (571)270-5072. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-270-6072.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tran Nguyen/

Primary Examiner, Art Unit 2834

JK